

The Global Nuclear Energy Partnership (GNEP) seeks to expand the use of clean, affordable nuclear energy to meet the growing worldwide demand for energy.



The Global Nuclear Energy Partnership

The Global Nuclear Energy Partnership (GNEP) is a comprehensive strategy to increase U.S. and global energy security, reduce the risk of nuclear proliferation, encourage clean development around the world, and improve the environment.

A plentiful, reliable supply of energy is the cornerstone of sustained economic growth and prosperity. Nuclear power is the only proven technology that can provide abundant supplies of base-load electricity reliably and without air pollution or emissions of greenhouse gasses.

GNEP provides for the safe expansion of clean, affordable nuclear power to meet the growing worldwide demand for energy and encourage the growth of prosperity around the globe.

GNEP is both a major research and technology development initiative and a major international policy partnership initiative. It addresses the two key barriers to full development of nuclear power in the later half of the twentieth century: how to use sensitive technologies responsibly in

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"The world must create a safe, orderly system to field civilian nuclear plants without adding to the danger of weapons proliferation."

President George W. Bush
National Defense University
February 11, 2004

"To build a secure energy future for America, we need to expand production of clean, safe nuclear power."

President George W. Bush
Ronald Reagan Building
June 15, 2005

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a way that protects global security and how to dispose of the waste safely. GNEP focuses on overcoming these barriers, and doing so in cooperation with other advanced nuclear nations, to bring the benefits of nuclear energy to the world safely and securely.

President Bush has requested \$250 million in the Department of Energy's 2007 budget as the initial step to accelerate technology development as part of GNEP. The Department has requested funding from Congress to continue developing the structure for a collaboration among industry, the U.S. national laboratories, and other nations to meet the goals of GNEP. Such a collaboration would build on the existing, proven capabilities

of industry and the fuel cycle nations to bring commercial-scale, advanced fuel cycle technologies into operation in the U.S. as quickly as possible.

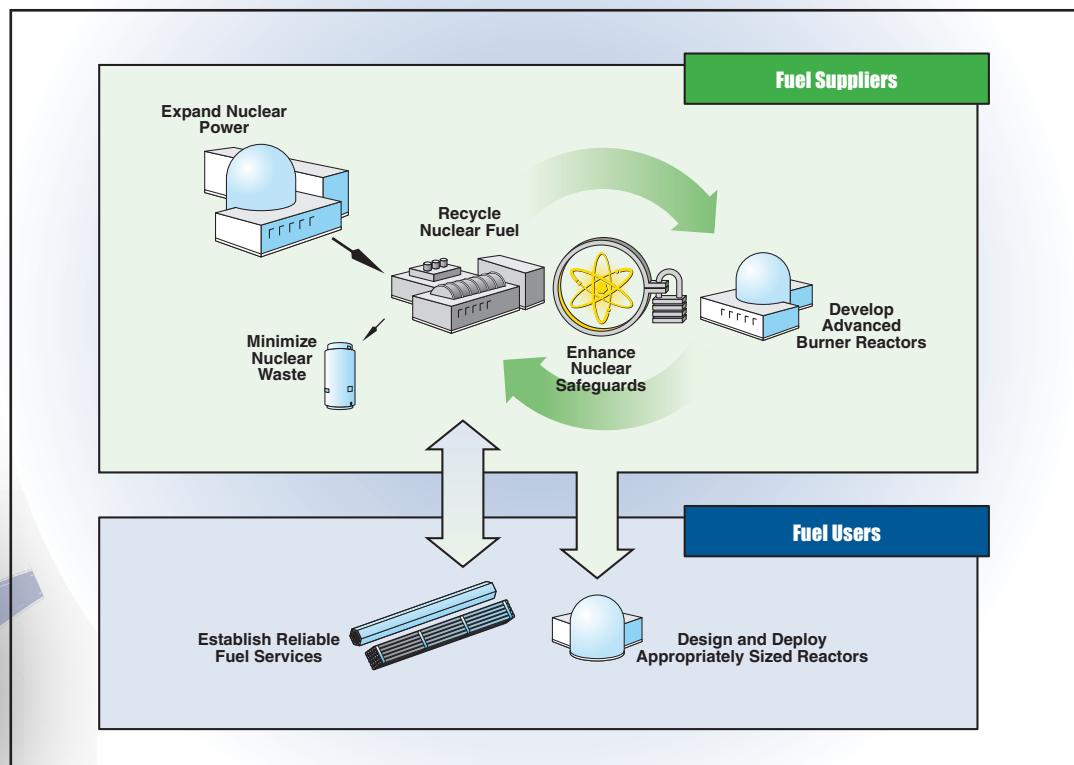
The Global Nuclear Energy Partnership aims to:

- Recycle nuclear fuel using new proliferation-resistant technologies to recover more energy and reduce waste
- The U.S. is considering a new approach to recycling of spent nuclear fuel with advanced technologies to increase proliferation resistance, recover and reuse fuel resources, and reduce the amount of wastes requiring

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The Global Nuclear Energy Partnership focuses on expanding nuclear power and establishing partnerships between fuel suppliers and fuel users.

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permanent geological disposal. This work builds on the Department's Advanced Fuel Cycle Initiative, which has been researching innovative recycle concepts since 2000.

- **Utilize the latest technologies to reduce the risk of nuclear proliferation worldwide**
By promoting proliferation resistant technologies and providing fuel services to developing nations, GNEP will bring the benefits of nuclear energy to the world safely and securely without all countries having to invest in the complete fuel cycle – that is, enrichment and reprocessing.
- **Encourage the growth of prosperity and sustainable development around the world**
By increasing the availability of electricity through nuclear power, millions of people will experience an improved and sustainable quality of life.
- **Reduce use of fossil fuels**
Nuclear power addresses concerns associated with the use of fossil fuels: rising costs, price volatility, increasing worldwide demand and air pollution.
- **Improve the environment**
Nuclear power is the only currently available technology capable of delivering large amounts of power without polluting the air. Last year, the operation of U.S. nuclear power plants displaced 681.9 million metric tons of carbon emissions.

The Global Nuclear Energy Partnership includes a broad implementation strategy:

- **A new generation of nuclear power plants in the U.S.**
GNEP will build on recent Administration accomplishments to encourage more nuclear power in the U.S. These include the Nuclear Power 2010 program, a public-private

partnership aimed at demonstrating the streamlined regulatory processes associated with licensing new plants, and the Energy Policy Act of 2005, which includes federal risk insurance for the first new nuclear power plants to be built.

- **An integrated U.S. recycling capability**

The U.S. is pursuing the transition from a once-through fuel cycle to a new approach that includes recycling of spent nuclear fuel without separating out pure plutonium. Specifically, recycling would comprise uranium extraction plus (UREX+).

Research has shown that UREX+ can separate uranium from the spent fuel at a very high level of purification that would allow it to be recycled for re-enrichment, stored in an unshielded facility, or simply buried as a low-level waste. In addition, long-lived fission products, technetium and iodine, could be separated and immobilized for disposal in Yucca Mountain. Short-lived fission products, cesium and strontium, could be extracted and prepared for decay storage until they meet the requirements for disposal as low-level waste. Finally, transuranic elements (plutonium, neptunium, americium and curium) separated from the remaining fission products could be fabricated into fuel for an Advanced Burner Reactor, a fast reactor. Fast reactors would consume or destroy the transuramics, reducing the need for disposal in Yucca Mountain. This approach would increase the effective capacity of the geologic repository by an estimated factor of 50 to 100.

The Department is investigating the interest and ability of industry to deploy an integrated recycling capability consisting of two facilities:

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- A Consolidated Fuel Treatment Center, capable of separating the usable components contained in light water spent fuel from the waste products.
 - An Advanced Burner Reactor, capable of consuming those usable products from the spent fuel while generating electricity.
- U.S. national laboratories would design and direct a third component, the Advanced Fuel Cycle Facility, a modern state-of-the-art laboratory designed to serve fuels research needs for the next 50 years.
- **An aggressive plan to manage spent nuclear fuel and nuclear waste in the U.S., including permanent geologic disposal at Yucca Mountain**
- Successful demonstration of GNEP technologies will change the characteristics and, potentially, significantly reduce the toxicity of spent fuel and nuclear waste to be disposed of in Yucca Mountain. This will make disposal less complex and potentially extend the capacity of Yucca Mountain for generations to come.
- **A reliable fuel services program**
- Under GNEP, a consortium of nations with advanced nuclear technologies would provide fuel and reactors that are appropriately sized for the grid and the industry needs of other countries that agree to refrain from fuel cycle activities. By participating in GNEP, developing nations can enjoy the benefits of clean, safe nuclear power while minimizing proliferation concerns and eliminating the need for expensive infrastructure

investments. In cooperation with the International Atomic Energy Agency, participating nations would develop international agreements to ensure reliable access to nuclear fuel.

• Grid-appropriate reactors

GNEP would call for a program to design, build and export nuclear reactors that are cost effective, well suited to conditions in developing nations and scaled for small electricity grids. The U.S. is cosponsoring with the International Atomic Energy Agency (IAEA) and several IAEA member states a workshop in Vienna, Austria, Dec. 4-6, 2006.

• Improved nuclear safeguards to enhance the proliferation-resistance and safety of expanded nuclear power

A basic goal of GNEP is to make it nearly impossible to divert nuclear materials or modify systems without immediate detection; thus, an international safeguards program is key to every element of its implementation. The U.S. will continue to work closely with the IAEA and our international partners to ensure that civilian nuclear facilities are used only for peaceful purposes.

Issues for the introduction of nuclear power:

The U.S. has heard from a number of countries expressing interest in adding nuclear power to their energy mix to meet energy demands and increase energy security. There are a few experienced countries with developed nuclear power programs that have a responsibility to share their expertise on legal, regulatory, safety and security cultures pertaining to the incorporation of nuclear power.